

Water Flea (*Cornigerius maeoticus maeoticus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, Web Version – 9/13/2017

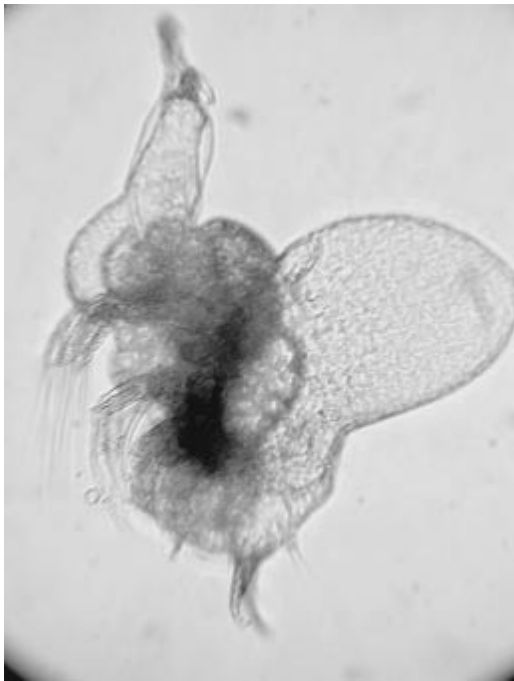


Photo: Rodionova et al. (2005, Figure 1).

1 Native Range and Status in the United States

Native Range

From Rodionova et al. (2015):

“[...] outside the limits of its initial range (the Sea of Azov and Caspian Sea) [...]”

From Mordukhai-Boltovskoi (1967):

“Distribution. -- Sea of Asov, mainly in slightly brackish (oligo- and meiomesohaline) waters (Gulf of Taganrog and northeastern part of the open sea); Dnjepro-Bug liman and limans in the Danube delta. It occurs also in quite fresh waters and in the Danube River; [...]”

From Baker et al. (2015):

“Ponto-Caspian basin, lower reaches of Danube, Dnieper, and Bug rivers (Panov et al. 2007).”

Status in the United States

From Baker et al. (2015):

“Status: Not established in North America, including the Great Lakes”

Means of Introductions in the United States

No records of *Cornigerius maeoticus maeoticus* in the United States were found.

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Kotov et al. (2016):

“Accepted scientific name: *Cornigerius maeoticus maeoticus* (Pengo 1879) (accepted name)”

“Kingdom Animalia
Phylum Arthropoda
Class Branchiopoda
Order Diplostraca
Family Podonidae
Genus *Cornigerius*
Species *Cornigerius maeoticus*”

From Rodionova et al. (2005):

“Subsequently, Mordukhai-Boltovskoi and Rivier [Mordukhai-Boltovskoi and Rivier, 1987] revised polyphemids from the Sea of Azov and the Black, Caspian, and Aral seas and showed the existence of two subspecies in the typical species *Cornigerius maeoticus*: *C. m. maeoticus* (Pengo) and *C. m. hircus* (Sars) differing in their shell structure.”

Size, Weight, and Age Range

From Mordukhai-Boltovskoi (1967):

“Adult parthenogenetic females measure between 0.55 and 1.1 mm; being usually 0.7 to 8 mm”

“Males are somewhat smaller than females, measuring 0.6 to 0.7 mm.”

Environment

From Mordukhai-Boltovskoi (1967):

“[...] mainly in slightly brackish (oligo- and meiomeso haline) waters [...] occurs also in quite fresh waters [...]”

From Baker et al. (2015):

“This species tolerates temperatures from 11 to 23°C (Panov et al. 2007). *Cornigerius maeoticus maeoticus* can live in freshwater and has an upper limit of 20-24‰ salinity (Mordukhai-Boltovskoi and Rivier 1971; Aladin 1995). This species can tolerate a variety of nutrient levels. In large lakes, this species prefers to reside in the metalimnion (Mordukhai-Boltovskoi and Rivier 1971).”

Climate/Range

Climate/Range information not available for *Cornigerius maeoticus maeoticus*.

Distribution Outside the United States

Native

From Rodionova et al. (2005):

“[...] outside the limits of its initial range (the Sea of Azov and Caspian Sea) [...]”

From Mordukhai-Boltovskoi (1967):

“Distribution. -- Sea of Asov, mainly in slightly brackish (oligo- and meiomeso haline) waters (Gulf of Taganrog and northeastern part of the open sea); Dnjepro-Bug liman and limans in the Danube delta. It occurs also in quite fresh waters and in the Danube River; [...]”

From Baker et al. (2015):

“Ponto-Caspian basin, lower reaches of Danube, Dnieper, and Bug rivers (Panov et al. 2007).”

Introduced

From Rodionova et al. (2005):

“*C. m. maeoticus* was first encountered in the eastern part of the Gulf of Finland on August 24, 2003 (it was the first finding in the Baltic Sea) at the deep-water station in a sample from the surface layer, where two juvenile individuals 0.6 mm in size were recognized. A month later (on September 30), two mature females without eggs in their brood chambers (Figs. 1, 2 [in source material]) were found in samples from the shallow-water station (with sizes of 0.75 and 0.85 mm). Despite the small abundance (1.3–1.7 ind./m³), the simultaneous findings of *C. m. maeoticus* individuals in two different regions of the Gulf of Finland may point to the establishment of a new population of this species in the eastern part of the Baltic Sea.”

“The expansion of *C. maeoticus* outside the limits of its initial range (the Sea of Azov and Caspian Sea) started after the creation of reservoirs on the Don, Dnieper, and Volga rivers, when certain operations aimed at the acclimatization of benthic invertebrates for the “enhancement” of the food base of the fish were implemented. *C. maeoticus* consequently appeared in the Kakhovka (1959), Tsimlyansk (1961), Zaporozhsk (1965), and Kremenchug (1969) reservoirs [Sheinin, 1964; Mordukhai-Boltovskoi, 1965; Mordukhai-Boltovskoi and Galinskii, 1974; Gusynskaya and Zhdanova, 1978]. In the 1980s, this species was widespread in the summer plankton of all the reservoirs of the Dnieper River (the Kiev, Kanev, Kremenchug, Dneprodzerzhinsk, Zaporozhsk, and Kakhovka), where its abundance in the plankton samples comprised 17–54% [Gusynskaya, 1989]. *C. maeoticus* also invaded the Volga River: in 1970, it was encountered in the middle part of the Volgograd Reservoir [V’yushkova, 1971].”

“In the Baltic Sea, this species was first noted in 1992 in the Gulf of Riga and in the Gulf of Finland.”

Means of Introduction Outside the United States

From Baker et al. (2015):

“From its native range, *Cornigerius maeoticus maeoticus* has locally spread into the Volga, Don, and Dnieper reservoirs, and the eastern Baltic Sea via shipping [transported in ballast water] (Krylov et al. 1999; Panov et al. 2007; Rodionova 2005; Sopanen 2008; Baltic Sea Alien Species Database 2007).”

Short Description

From Mordukhai-Boltovskoi (1967):

“Female. -- Horns on the head usually strongly chitinized and often coloured brown (as well as the top part of the trunk), always pointed, curved at the ends and strongly diverging, divided by an arcuate interspace. They vary in form, being often curved and bearing on the end several minute denticles (figs. 1-4 [in source material]). Occasionally anomalies occur, e.g., underdevelopment of one horn. The shell is evenly rounded, comparatively short, and as long as wide at the base.”

“Gamogenetic females, i.e. those bearing the one or two latent eggs, do not differ from the parthenogenetic females in their appearance. They occur rather rarely and as single specimens. Male. -- The males differ from the females, in addition to the above mentioned characters, in the shape of the shell, tapering towards, though rounded at the top.”

Biology

From Sopanen (2008):

“Like *C. pengoi*, these species [*Cornigerius maeoticus maeoticus* and *Evadne anonyx*] also have the ability to form resting eggs that are potential agents by which new areas can be colonized (reviewed by Panov et al. 2007).”

From Baker et al. (2015):

“Its diet consists of small planktonic organisms, including microcrustaceans. It is preyed on by planktivorous fish and larger predatory zooplankton. *Cornigerius maeoticus maeoticus* produces resting stages that are tolerant of harsh environmental conditions (Rodionova 2005). This species exhibits a high fecundity compared to similar species in the Baltic Sea and is capable of parthenogenesis (Mordukhai-Boltovskoi 1967; Panov et al. 2007).”

Human Uses

No information on human uses of *Cornigerius maeoticus maeoticus* was found.

Diseases

No information on diseases of *Cornigerius maeoticus maeoticus* was found.

Threat to Humans

From Baker et al. (2015):

“It has not been reported that *Cornigerius maeoticus maeoticus* poses a threat to human health or water quality.”

3 Impacts of Introductions

From Baker et al. (2015):

“There is insufficient information available to determine if *Cornigerius maeoticus maeoticus* poses a threat to other species or water quality. There are no reports on how it affects or interacts with other species. It is unknown whether this species alters the physical components of the ecosystem.”

4 Global Distribution

No maps of the distribution of *Cornigerius maeoticus maeoticus* were available. Figure 1 shows the general areas where this species is listed as established in the literature.

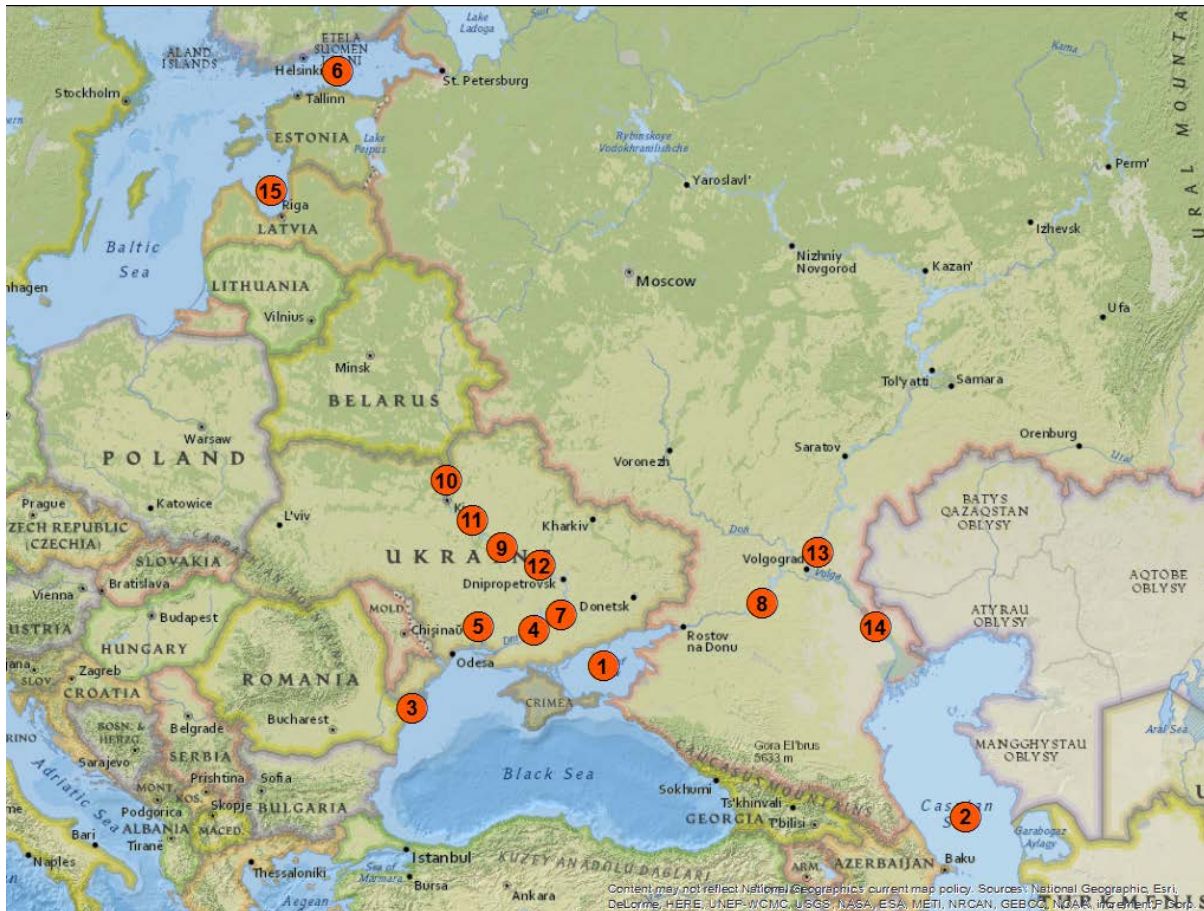


Figure 1. Global distribution of *Cornigerius maeoticus maeoticus* according to locations reported by Mordukhai-Boltovskoi (1967), Rodionova et al. (2005), and Baker et al. (2015). 1-Sea of Azov, 2-Caspian Sea, 3-Danube Delta, 4-lower Dnieper River, 5-lower Bug River, 6-Gulf of Finland, 7-Kakbova Reservoir, 8-Tsimlyansk Reservoir, 9-Kremenchug Reservoir, 10-Kiev Reservoir, 11-Kanev Reservoir, 12-Dneprodzerzhinsk Reservoir, 13-Volgograd Reservoir, 14-lower Volga River, 15-Gulf of Riga

5 Distribution Within the United States

No records of *Cornigerius maeoticus maeoticus* in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Cornigerius maeoticus maeoticus* was high around the Great Lakes and in areas of the Great Plains. It was low along the Pacific Coast, in the south, and along the Atlantic Coast; the match was medium everywhere else. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the Continental U.S. was 0.321, high, and high in Arizona, Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri,

Montana, Nebraska, Nevada, New Mexico, New York, Ohio, Pennsylvania, South Dakota, Utah, Vermont, Wisconsin, and Wyoming.

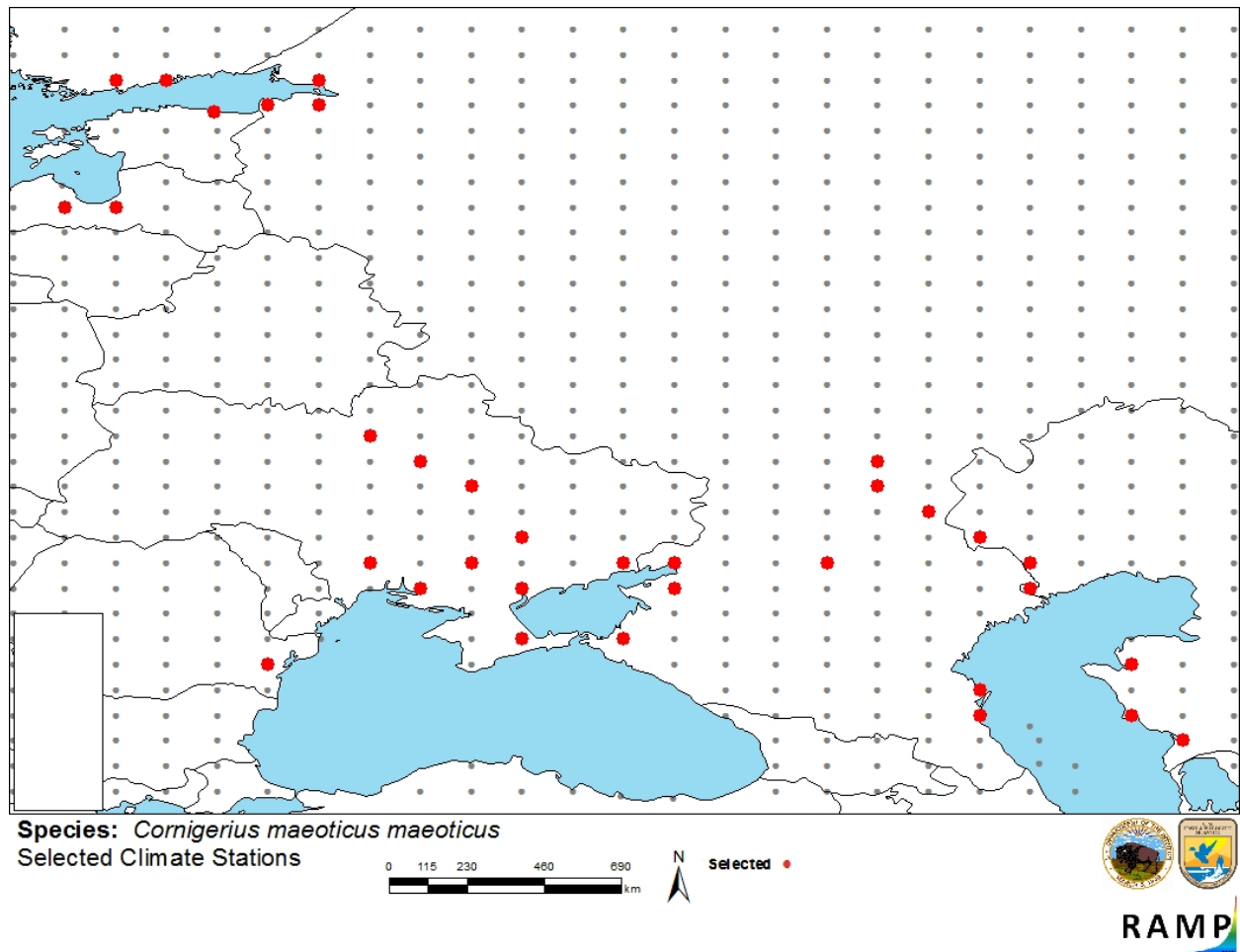


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Cornigerius maeoticus maeoticus* climate matching. Source locations from Mordukhai-Boltovskoi (1967), Rodionova et al. (2005), and Baker et al. (2015).

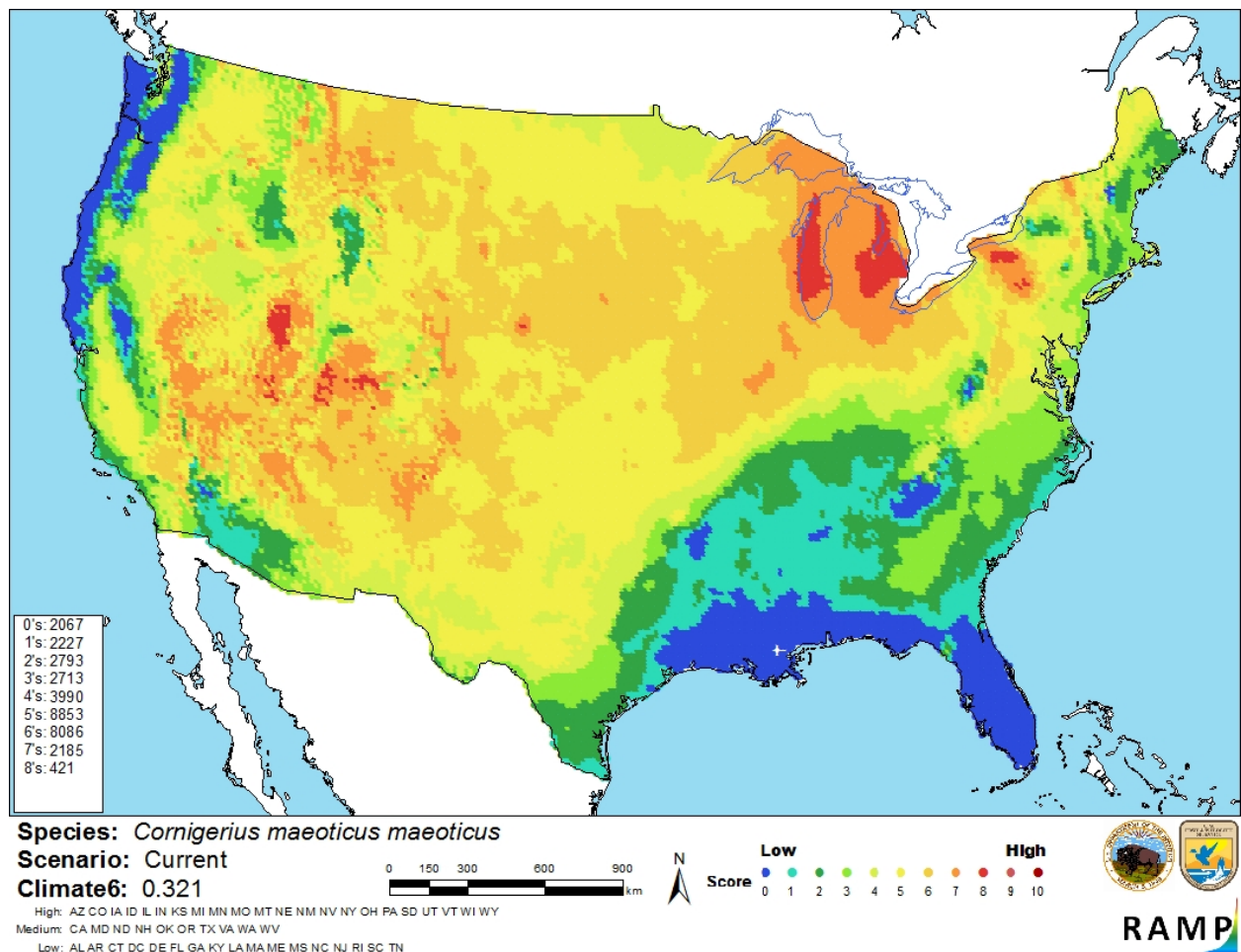


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Cornigerius maeoticus maeoticus* in the contiguous United States based on source locations reported by Mordukhai-Boltovskoi (1967), Rodionova et al. (2005), and Baker et al. (2015). 0=Lowest match, 10=Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

The certainty of assessment is low. There is minimal information available for *Cornigerius maeoticus maeoticus* and very limited distribution information. There was no georeferenced distribution information available.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The history of invasiveness of *Cornigerius maeoticus maeoticus* is not documented. There is a history of introductions but no information on any impacts. The lack of information on impacts may be due to a lack of research in general or the research has been published in non-English language journals. The climate match is high, especially in the Great Lakes basin where Baker et al. (2015) states that it could be introduced through ballast water from the Baltic Sea. The certainty of assessment is low. There is missing information and the distribution used in the climate match is based on generalized written sources and is not believed to be complete. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information No additional remarks.**
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

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- Rodionova, N. V., P. I. Krylov, and V. E. Panov. 2005. Invasion of the Ponto-Caspian predatory Cladoceran *Cornigerius maeoticus maeoticus* (Pengo, 1879) into the Baltic Sea. *Oceanology* 45(1):66-68.

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Sopanen, S. 2008. The effect of temperature on the development and hatching of resting eggs of non-indigenous predatory cladoceran *Cercopagis pengoi* in the Gulf of Finland, Baltic Sea. *Marine Biology* 154:99-108.

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

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Mordukhai-Boltovskoi, F. D. 1965. Caspian Polyphemids in the reservoirs of the Don and Dnieper Rivers. *Trudy Instituta Biologii Vnutrennikh Vod AN SSSR* 8(11):37–43.

Mordukhai-Boltovskoi, F. D., and V. L. Galinskii. 1974. On the further distribution of the Caspian Polyphemoidea over the reservoirs of the Ponto–Caspian rivers. *Biologiya Vnutrennikh Vod Informatsionnyi Byulleten* 21:40–44.

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